

Forest Resource Sustainability in Placer County California





Forest Resource Sustainability in Placer County, California

Millions of acres of forested land in the Sierra Nevada foothills and mountains are at significant risk for wildfire. Placer County alone encompasses approximately 550,000 acres of forested land stretching from Auburn to Lake Tahoe, including parts of two national forests and 60 percent of Lake Tahoe's west shore.

After decades of successful fire suppression, unnaturally dense vegetation presents a significant wildfire hazard. Just since 2001, Placer County has experienced six major wildfires that burned more than 55,000 acres, including important upland watersheds. Also in the last few decades, many homes and business have been developed within these forests in high fire hazard areas. Between 2006 and 2010, state and federal fire agencies spent an average of \$1.2 billion annually fighting wildfires in California. Fire restoration costs average in the tens of millions, but more importantly, fire jeopardizes ecological integrity by creating unacceptable impacts to forest resources like water and wildlife habitat, and generate additional tons of harmful emissions into the air.

In response, the Placer County Biomass Partners – including the Placer County Air Pollution Control District, Placer County, and U.S. Forest Service – are implementing cost effective projects that help promote the ecological, economic and social sustainability of forests and forest-dependent communities. These projects focus on improving forest health, reducing the negative effects of catastrophic wildfires by utilizing excess biomass from forest management projects to produce renewable power and create family wage jobs.

The partners specifically are focused on projects that support hazardous fuels reduction and processing and transporting excess biomass material – limbs, tops and brush – for energy production as an alternative to open pile burning. These efforts improve air and watershed quality, protect soil productivity, lower fire suppression costs, and produce renewable energy that reduces regional reliance on fossil fuels.

The partners specifically are focused on projects that support hazardous fuels reduction for mitigating catastrophic wildfire behavior, and processing and transporting excess biomass material – limbs, tops and brush – for energy production as an alternative to open pile burning.

Sustainable Forestry Practices in Support of Wildfire Mitigation

Stewardship Projects on Public Lands

We are implementing innovative agreements and contracts with the U.S. Forest Service and other partners aimed at facilitating cost-effective removal and utilization of forest biomass material for energy. Placer County has also entered into a master stewardship agreement for fuels treatment and biomass material recovery with the U.S. Forest Service's Lake Tahoe Basin Management Unit.

These forest fuels reduction projects to reduce the potential for catastrophic wildfire events include selective thinning and removal of trees and brush to return forest ecosystems to more natural fuel stocking levels, resulting in more fire-resilient and healthy forests.



Left: Biomass collection box. Right: Biomass chipping and transport operations.

These forest fuels reduction projects return forest ecosystems to more natural fuel stocking levels, resulting in more fire-resilient and healthy forests.

Regional Biomass Collection

We are currently implementing a program to cost effectively collect biomass material from forestland management and defensible space clearing. Centralized collection yards have been located and advertised for convenient biomass material drop-off. Biomass material processing and transport for utilization at energy recovery facilities then becomes cost effective.



Left: Roadside biomass pile. Right: Biomass pile loading operation.

Forest Management Benefits

We are sponsoring research efforts to determine the benefits of forest management projects. Models are being developed to quantify the effects of various levels of thinning and hazard reduction treatments on wildfire size and intensity. Initial results indicate three types of carbon benefits that are realized from forest management in the Sierra Nevada:

- Fuels treatments in the study area were shown to reduce the GHG and criteria air pollutant emissions from wildfires by decreasing the probability, extent, and severity of fires and the corresponding loss in forest carbon stocks.
- Utilizing biomass from forest management projects for energy production was shown to reduce GHG and criteria air pollutant emissions over the duration of the fuels treatment project compared to fossil fuel energy.
- Specific management and thinning of forests stimulates growth, resulting in more rapid uptake of atmospheric carbon – including reductions in air pollutant and greenhouse gas emissions, tree mortality, and improved forest growth and vigor.



Far Left: Effect of typical high intensity wildfire.

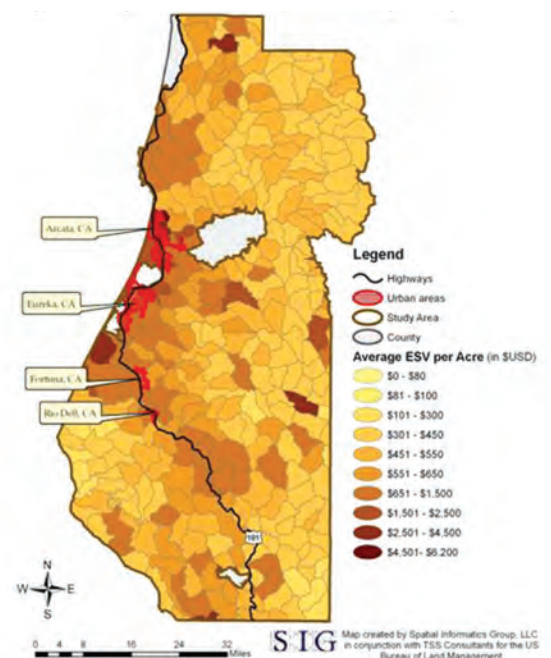
Left: Thinning and hazardous fuel treatments can reduce the effect of wildfires.

Current projects are exploring the valuation of the benefits of sustainable forest management strategies on key related resources such as carbon, water quantity and quality, and wildlife habitat.

Ecosystem Services

Fire, like development, can dramatically alter forested landscapes and significantly reduce or eliminate the flow of ecosystem services. Project partners are exploring the valuation of the benefits of sustainable forest management strategies on key resources such as carbon, water quantity and quality, and wildlife habitat.

Average Estimated Ecosystem Service Value per acre by Tributary Basin for Humboldt County Study Area



Source: Spatial Informatics Group (www.sig-gis.com)

Air Quality

Wildfires and Open Burning of Biomass

Catastrophic wildfires with high burn intensity and landscape-scale footprints in the densely forested Sierra Nevada mountain range have significant adverse effects on air quality. The September 2006 Ralston Fire in the Tahoe National Forest east of Foresthill, Calif., for example, burned a total of 8,423 acres and generated massive amounts of harmful emissions.

Forest management thinning and defensible space clearing generate biomass material in the form of limbs, tops, and brush from a wide variety of land ownerships, including federal, state, large and small private forestlands, conservation organizations and residences.

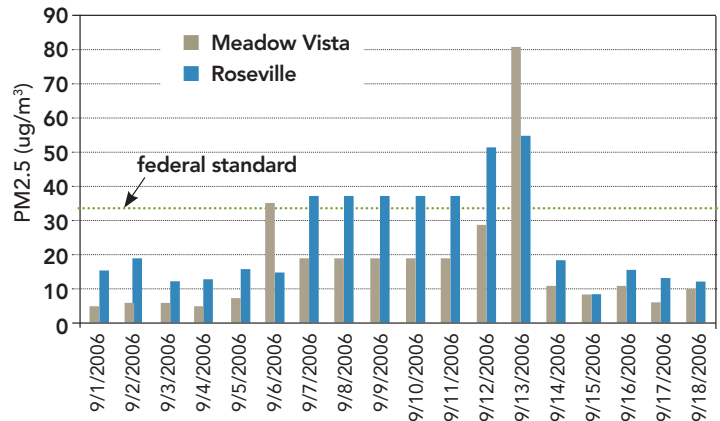
These forest biomass materials are frequently disposed of through open pile burning, due to economics – the cost to process and transport biomass is usually higher than the value paid by renewable power generation facilities.

Utilization of Biomass

We are sponsoring projects which collect, process, transport, and utilize woody biomass material for renewable energy generation in controlled conversion units as an alternative to open pile burning. Placer County has worked with the Forest Service's Lake Tahoe Basin Management Unit and the Tahoe National Forest to implement pilot projects that analyzed processes for collection, processing and transportation of excess woody biomass from forest management and hazardous fuels reduction projects. To date the projects have processed over 15,000 tons of biomass, produced 15,000 MWh of electricity and provided insights into improving the overall economics of forest management and biomass utilization.

Life cycle analysis has shown significant reductions in air pollutants by diverting biomass material away from open burning to renewable energy generation in biomass conversion facilities that are equipped with Best Available Control Technology. There are significant benefits from offsetting fossil fuel use and few emissions from the processing and transportation of the biomass – even if transporting for long distances.

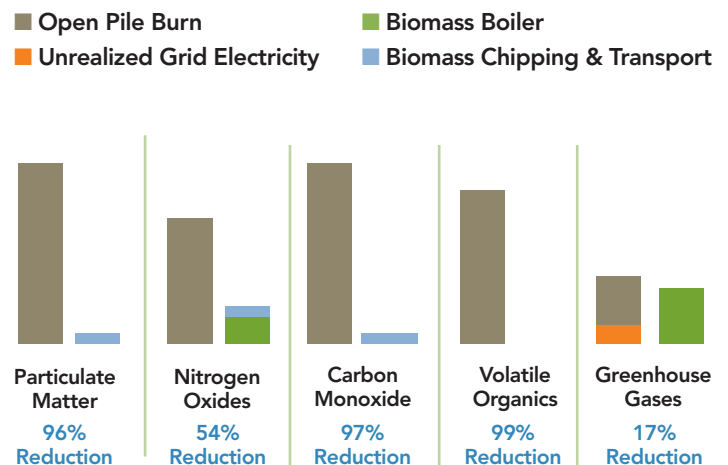
Particulate Matter During Ralston Wildfire



Disposing forest biomass materials through open pile burning.



Emission Benefits of Biomass Energy Project



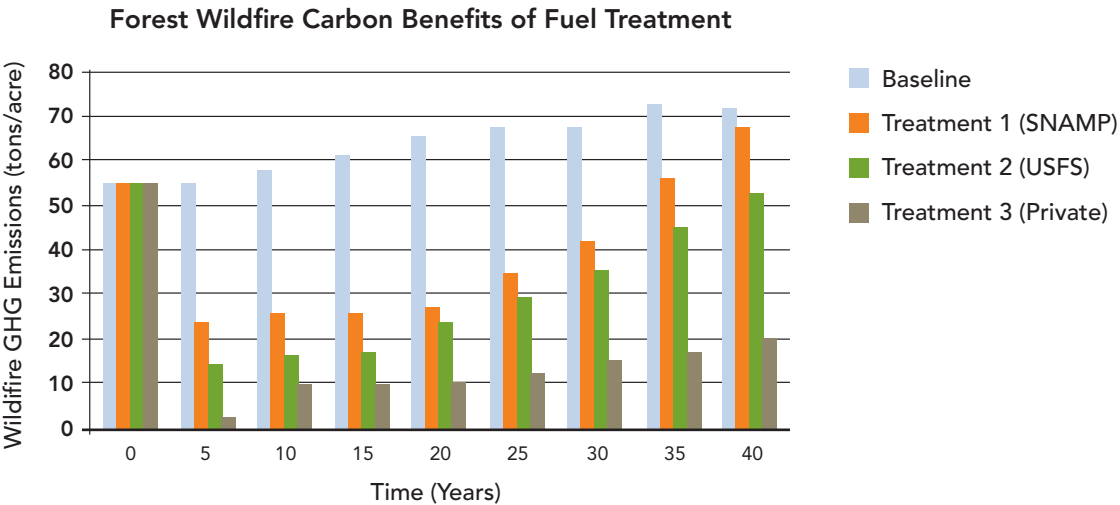
Results based on work by TSS Consultants (www.tssconsultants.com)



The monetary value secured from the sale of GHG offset credits is proposed to be re-invested in forest management projects like reforestation and thinning that provide carbon benefits.

Benefits of Hazardous Fuels Reduction Treatments

Hazardous fuels treatment activities can reduce air pollutant emissions through the reduction of wildfire intensity and size. We are supporting ongoing research efforts to develop models to quantify air benefits. Initial results from these research efforts confirm that proactive treatment of hazardous forest fuels mitigates both wildfire behavior and air emissions, including greenhouse gas.



Emissions Accounting

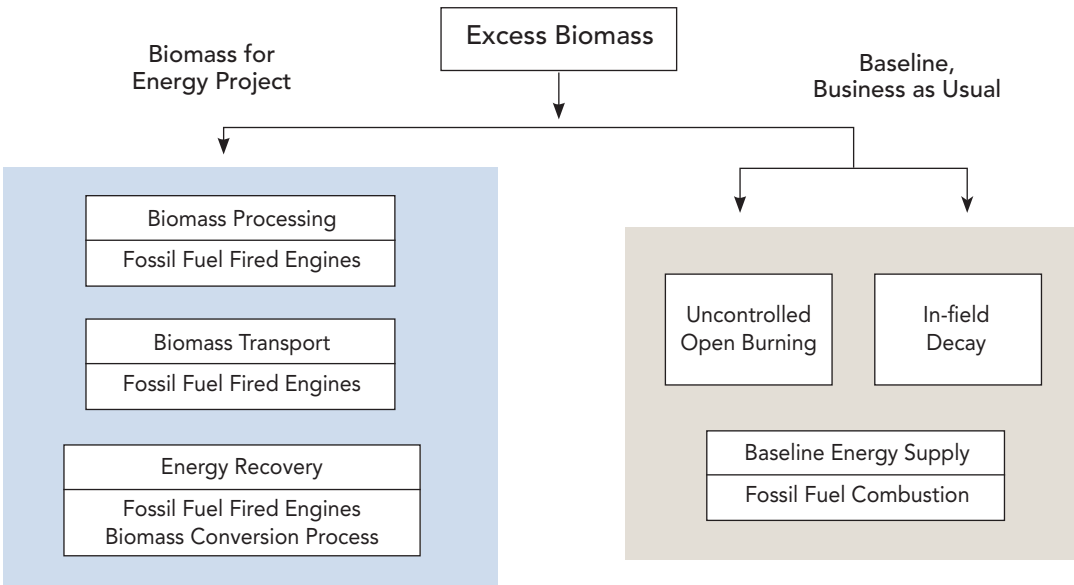
We have developed a greenhouse gas (GHG) offset protocol. This protocol provides a rigorous accounting framework for obtaining monetary value for the emissions benefits (in the form of emission offset credits) from the diversion of biomass material away from pile and burn activities and into renewable energy facilities. The monetary value secured from the sale of emission offset credits will be re-invested in forest management projects like reforestation and thinning that provide GHG benefits. Thinning helps reduce the effects of wildfires that emit large quantities of GHG's and negatively impact key forest resources like water and wildlife habitat.



Open pile burn.



Cogeneration facility.



GHG Reduction = GHG Open Burn + GHG Decay + GHG Baseline Energy
- GHG Biomass Energy - GHG Biomass Processing - GHG Biomass Transport

Renewable Bioenergy

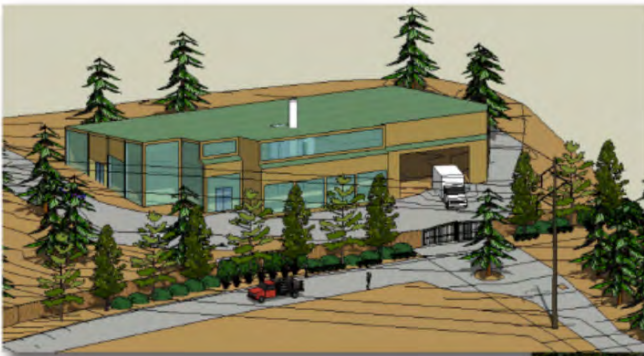
Sustainable Distributed Bioenergy in the Lake Tahoe Area

Placer County is proposing a Lake Tahoe Region biomass facility through a public-private partnership. The distributed generation renewable energy facility is scheduled to commence operation in FY 2014. Innovative features of the proposed facility include:

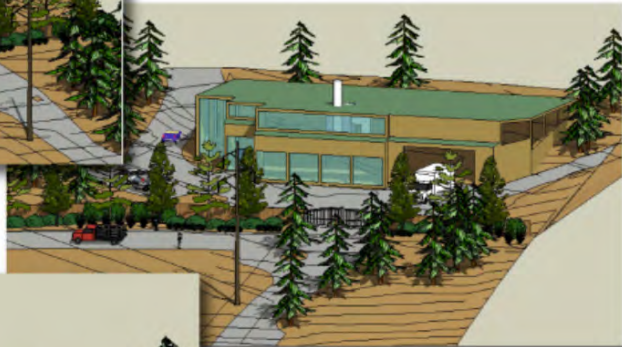
- Conservatively sized to produce 2 MW of electricity through use of excess woody biomass materials produced from nearby forest thinning and community defensible space fuels reduction projects.
- Lower energy facility fuel cost by developing innovative woody biomass supply agreements with local land managers. Funds normally used to dispose of excess biomass through open burning or mastication can be used instead to help fund the processing and transport of forest biomass to an energy production facility.
- Lower fuel cost by efficiently integrating forest management with biomass production.
- Utilize state-of-the-art gasification energy conversion technology that provides high electricity production efficiency and low air emissions that meet stringent local and federal limits.
- Fully realize the economic value of renewable energy and air emission benefits in support of community protection, healthy forests and local employment.



Loading chipped biomass for transport



Proposed Lake Tahoe Region biomass facility





We are also developing a guidebook that will provide guidance, and lessons learned, in support of small distributed-generation biomass power facility development. The guidebook will assist communities that are interested in the proactive treatment of hazardous forest fuels and utilization of resulting biomass material for the production of power and/or thermal energy.

Advanced Biofuels for Transportation

Placer County is a participant in a pilot study grant from the California Energy Commission to demonstrate and evaluate the production of biomethane (also known as renewable natural gas) from forest-sourced woody biomass materials for use as an alternative transportation fuel.

Placer County and the Placer County Air Pollution Control District have been strong and visible advocates and participants, at both the state and national level, for development and adoption of policies that favor protection of communities, wise forest management, utilization of excess biomass for energy, and long-term sustainability of forests, forest resources and forest-dependent communities.



Policy Recommendations

We have been strong and visible advocates and participants, at both the state and national level, for development and adoption of policies that favor protection of communities, wise forest management, utilization of excess biomass for renewable energy, and long-term sustainability of forests, forest resources and forest-dependent communities. These policies could include:

- Feed-in tariff renewable energy pricing that provides market-based incentives that facilitate private sector investment in community-scale for bioenergy facilities
- Greenhouse gases from excess biomass materials need to be recognized as at least carbon neutral, and beyond carbon neutral if appropriate
- Streamlining of interconnection, siting requirements for community-scale bioenergy facilities
- Electricity contract pricing that is not based on short run avoided costs or market price referent
- Federal tax credits for biomass energy generation that is commensurate with other forms of renewable energy (wind, solar)
- Continued funding for proactive forest fuels treatment on public lands
- Continued use of long-term stewardship contracts and agreements to facilitate landscape level fuels treatment activities
- Federal tax credit for private forest landowners that treat hazardous forest fuels
- Development and implementation of ecosystem services/payments

Select Project Publications

Bruce Springsteen, Tom Christofk, Steve Eubanks, Tad Mason, Chris Clavin, and Brett Storey, "Emission Reductions from Woody Biomass Waste for Energy as an Alternative to Open Burning", *Journal of the Air and Waste Management Association*, Volume 61, pages 63 - 68, January 2011.

"Forest Biomass Removal on National Forest Lands", Prepared by the Placer County Executive Office and TSS Consultant for the Sierra Nevada Conservancy, November 17, 2008, available at <http://www.tssconsultants.com/presentations.php>

"Assessment of Small-Scale Biomass Combined Heat and Power Technologies For Deployment in The Lake Tahoe Basin", Prepared by TSS Consultants for the Placer County Executive Office, High Sierra Resource Conservation and Development Council, and U.S. Forest Service, December 2008, available at <http://www.placer.ca.gov/Departments/CommunityDevelopment/Planning/Biomass/Grants.aspx>

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